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DESCRIPTION *of a* STEAM ENGINE.

By JOHN COOKE, Esq; M. R. I. A.

STEAM is univerfally allowed to be the greateft moving power we have, and therefore if it were rendered manageable, and adapted to the occafions of art, it might be advantageoufly applied where water, wind, men or horfes, are now ufed.

Read Feb.
7, 1789.

WATER is feldom convenient, wind is a feeble precarious agent, and mufcular force is very expenfive, and very limited; but fteam is free from each of thefe imperfections, and is fuperior to all in ftrength and duration.

It has been already applied to work the reciprocating or lever engine, which is furprizingly effectual in pumping water, in beating iron, and in other operations which require diftinct and fucceffive impulfes.

BUT to make fteam anfwer the various purpofes of mechanics, it is neceffary that it fhould be capable of producing a *continu-*

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ous and rotative motion, which itself is more extensively useful than any other, and from which every modification of motion can be easily obtained.

THIS machine consists of three principal parts, the wheel, represented fig. 1; the case, fig. 2, and the condenser, which is the same with that used in Mr. Watts's engine, and requires no description. The wheel, fig. 1, has a broad flat edge, *a b*, which is truly circular and smooth; at equal distances on this edge are placed eight folding clacks or valves, *b c d e f g h i*; these are attached to the wheel by small moveable joints, which are so contrived that when shut they range exactly with the surface of the edge of the wheel, and are capable of opening half way, but no more: For instance, the valve *a n m b*, has a joint at *n m*, which will permit it to open through the arch *b k l*, until it arrives at the situation *l m*, but no farther. These joints are so pliant that in the revolution of the wheel the valves will fall open when they descend near the level of the axis; and when they ascend above it they will shut, by their own gravity.

THE case of this wheel is represented, fig. 2. The sides of it are at such a distance from each other as that the wheel will exactly fill up the aperture *a b*, and the caps *c* and *d* are so fitted that the edge of the wheel will come in close contact with them. This case is so much deeper than the wheel, that the wheel, when fixed in it, leaves a semicircular vacancy, *e f g h*, below it, which is exactly filled up by the valves of the wheel when extended. *i* is the tube to admit the steam,

steam, and *k* is the pipe which leads to the condenser and drains the machine, both which must be open, but in all other parts the case is steam tight. *a*, fig. 3, is a rod which shuts the valves as they approach it, and delivers them closed into the steam vessel.

WHEN the wheel is put into this case, and suspended on its axis, fig. 3, the valves within the case will open and fill up the semicircular vacancy: When the steam passes up from the boiler through the tube it cannot escape unless through this semicircular vacancy, and as this is filled up by the extended valves it must force them forward in its passage to the condenser, and consequently turn the wheel round. The condenser is worked by a crank in the axis, and a rod *b c* extending from it; this causes a constant vacuum in that part of the semicircular vacancy which lies between the cap *d* and the valve *e f*, on which the steam presses; by these means a power is added to the elasticity of the steam equal to the pressure of the atmosphere, so that when the force of the steam is only equal to the pressure of the atmosphere, and the valves are six inches square, the wheel will be forced round by a power equal to $53\frac{1}{4}$ lb. suspended at its circumference.

AFTER each valve has performed this operation, another succeeds it in the like circumstances, and thus the wheel is turned round uninterruptedly by a cheap and simple contrivance.

A WORKING model of this engine, without the condenser, was exhibited to several members of the Royal Irish Academy.

Fig 1

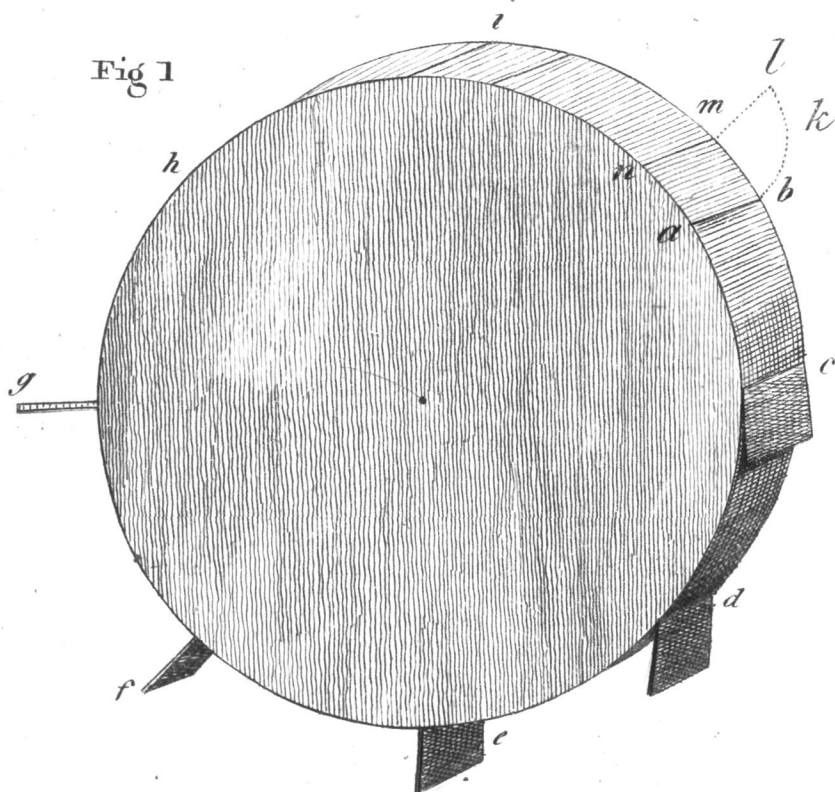


Fig 3

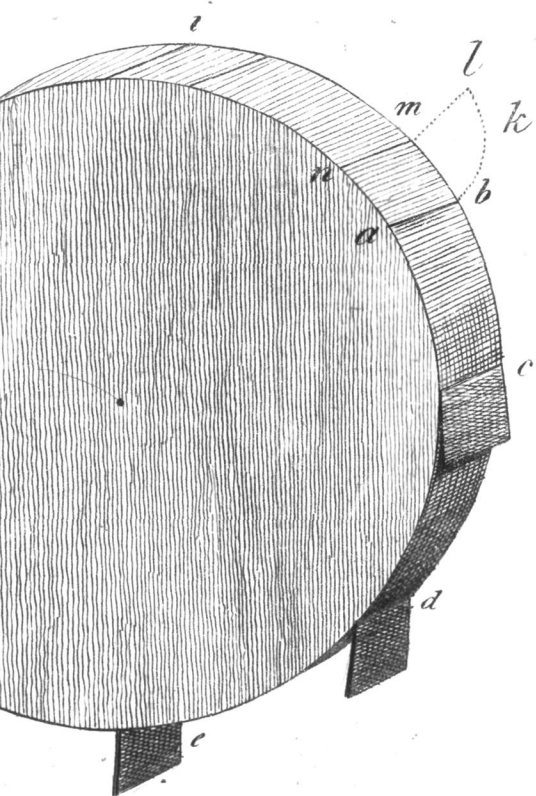


Fig 3

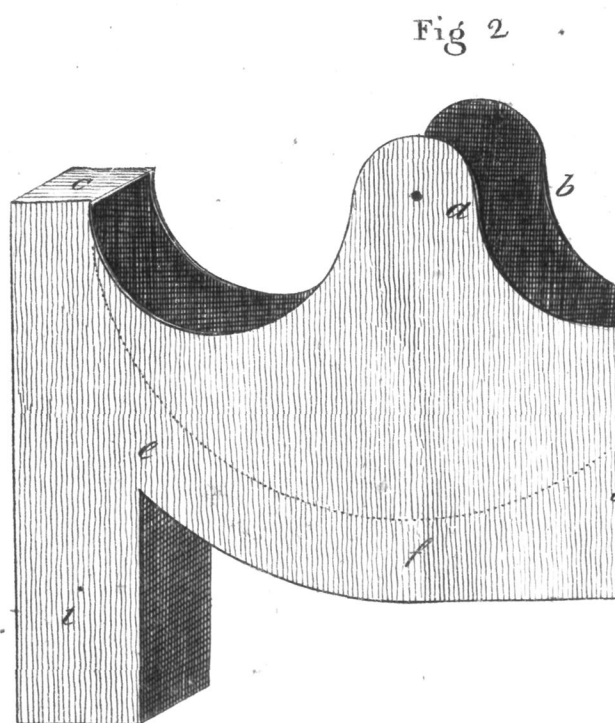


Fig 2

Fig 2 .

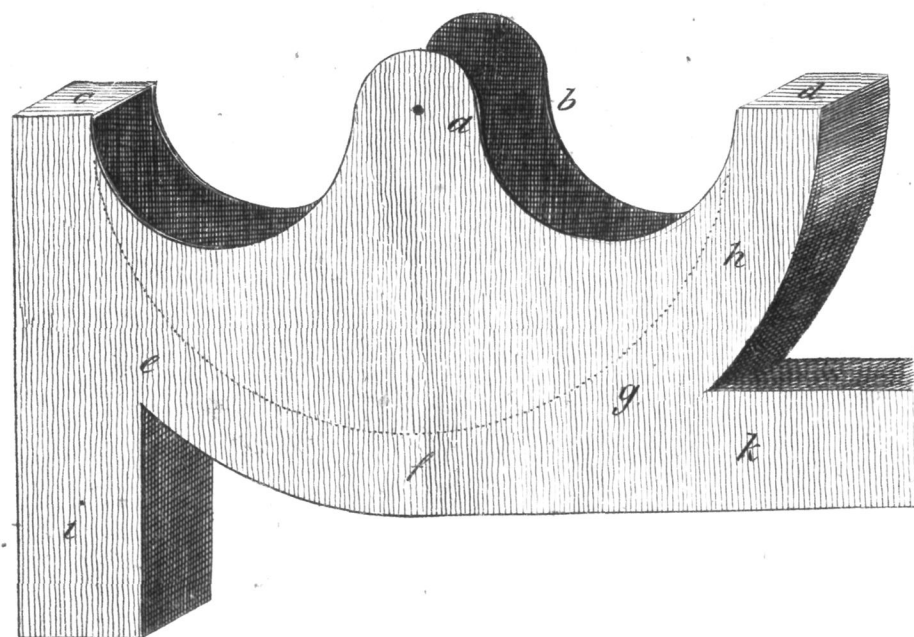


Fig 1

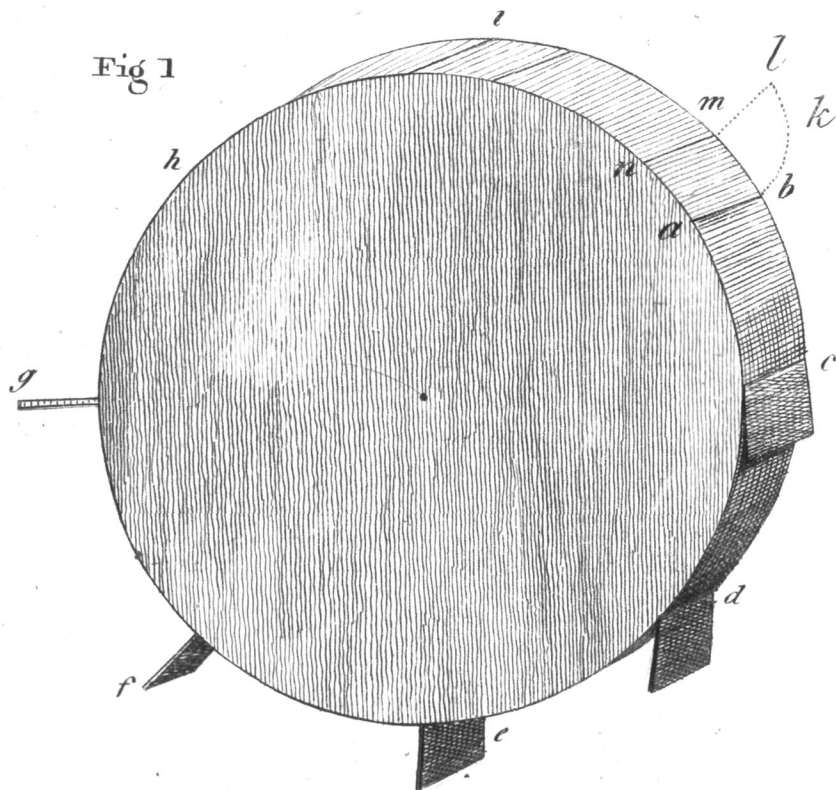
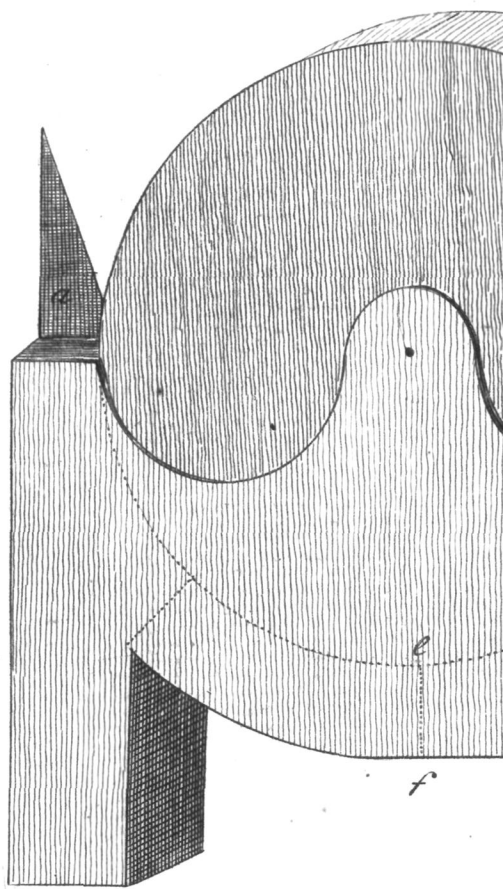


Fig 3



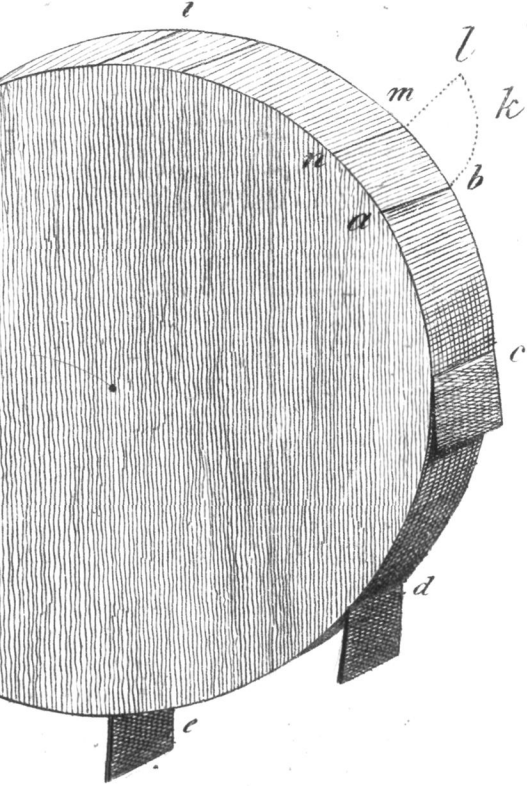


Fig 2

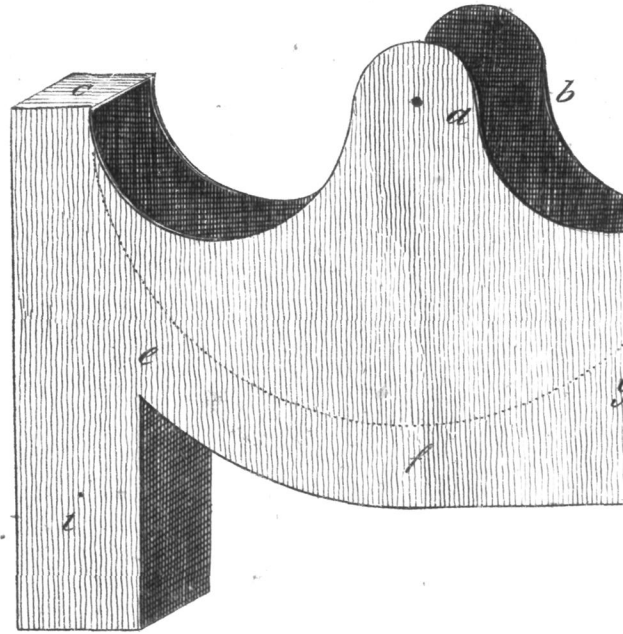


Fig 3

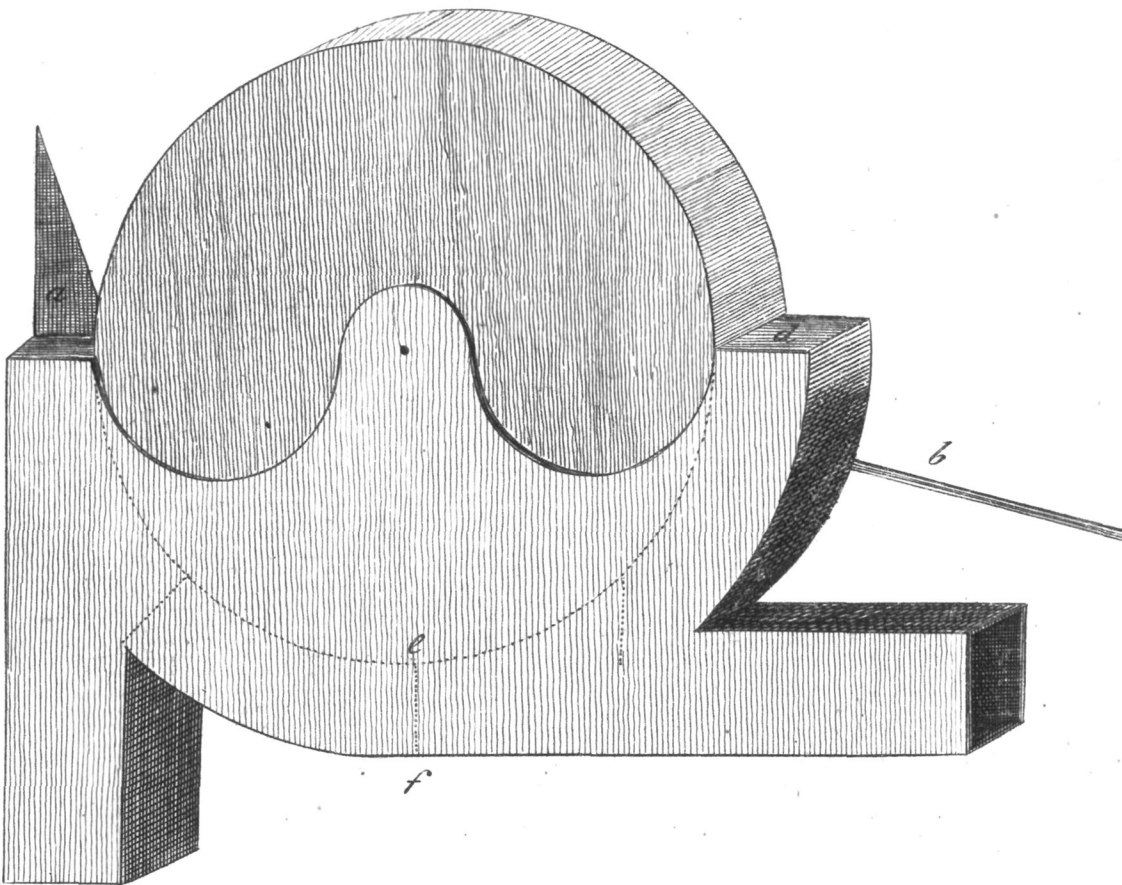
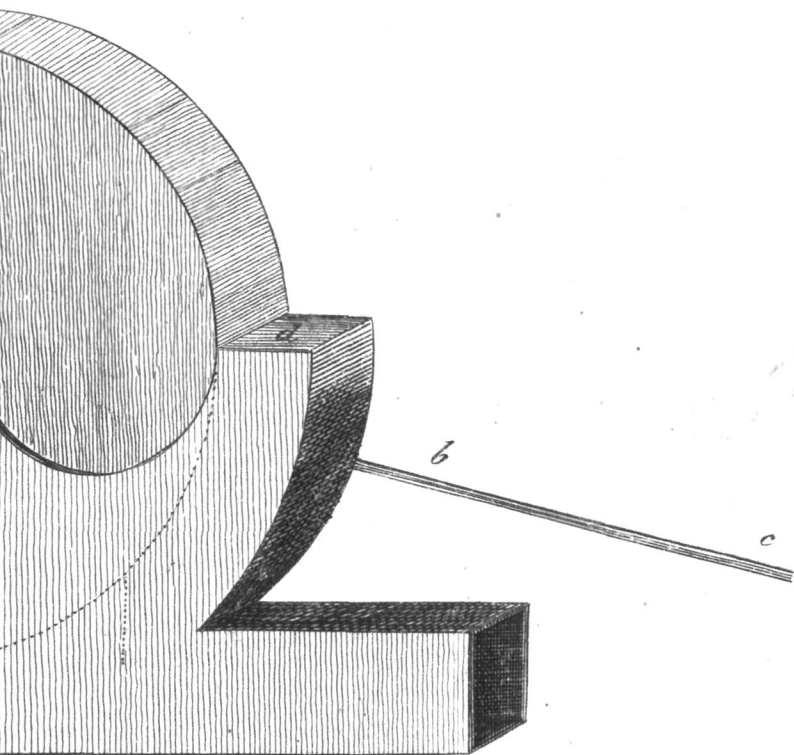
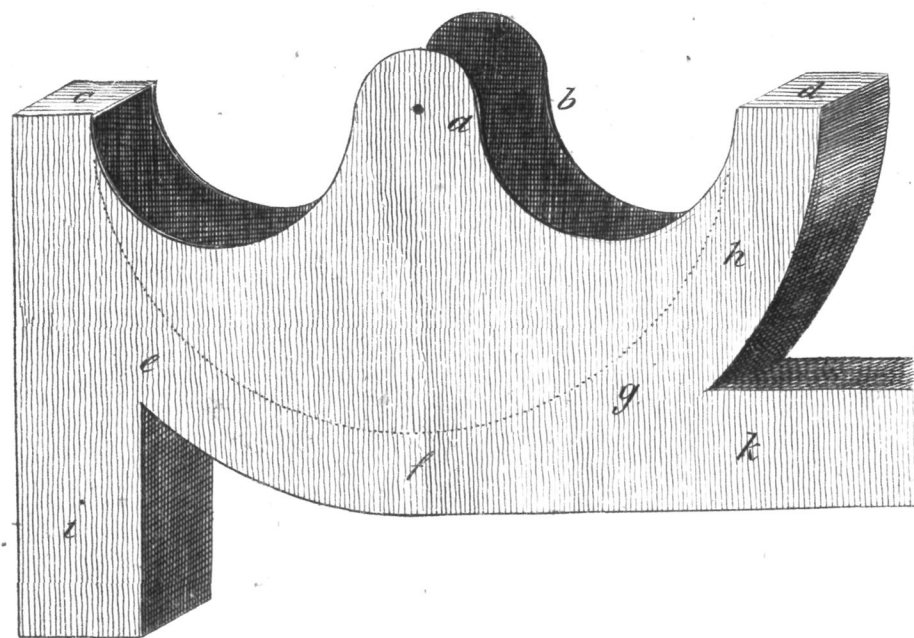
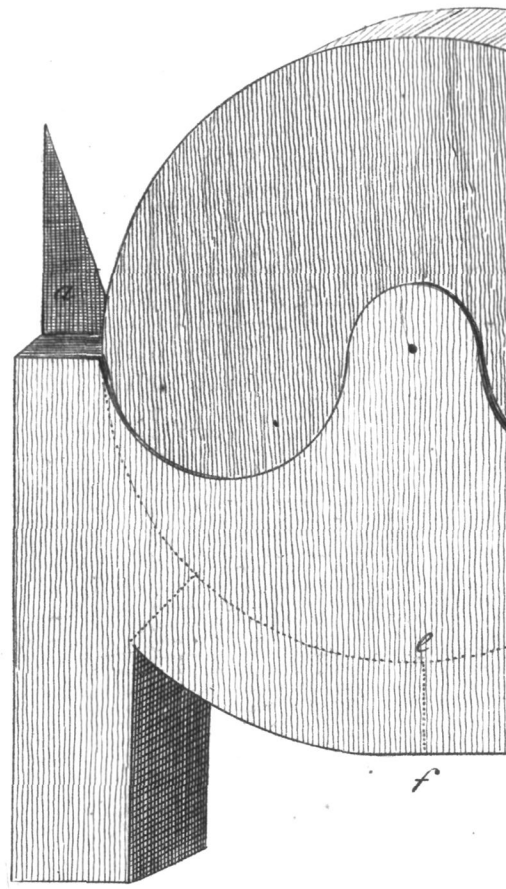
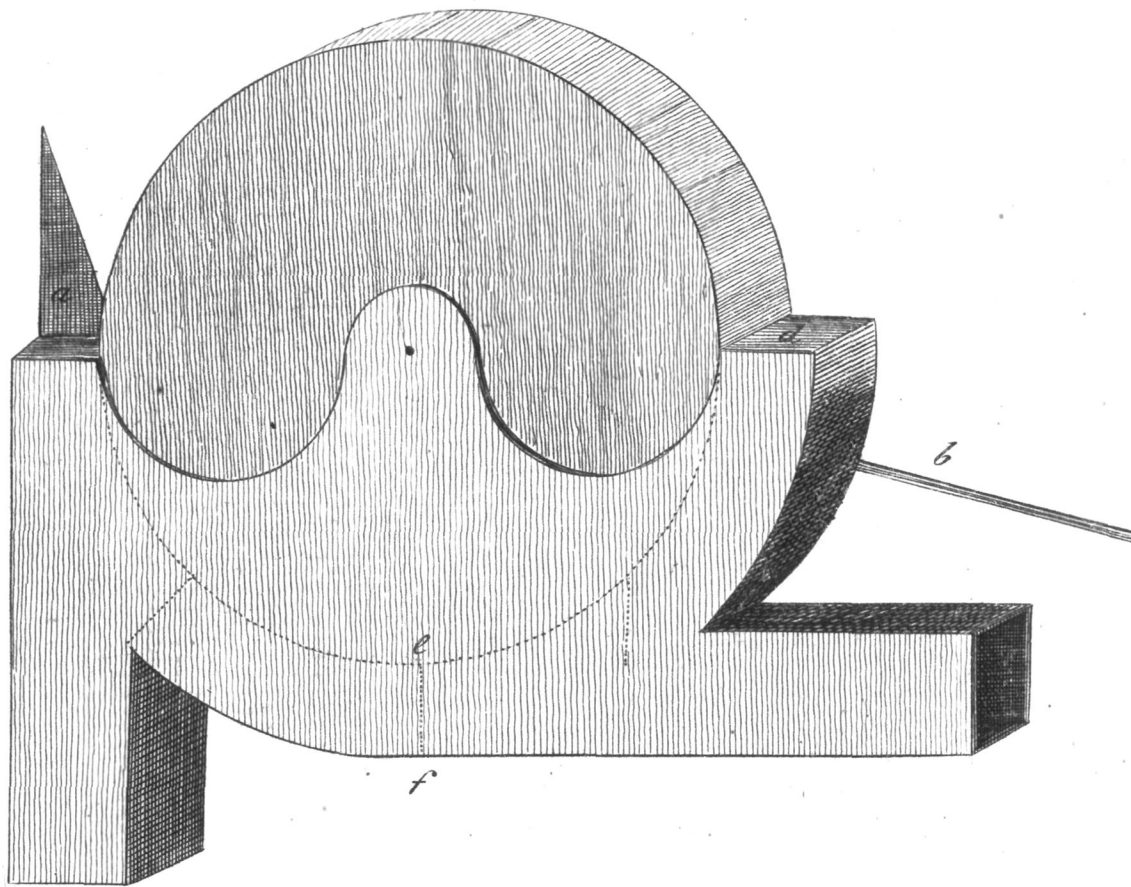
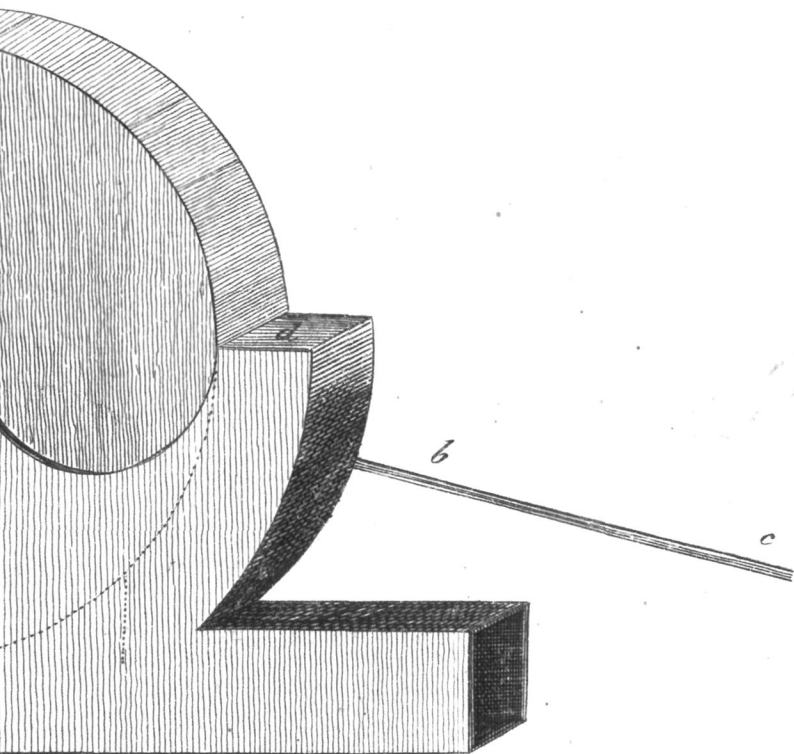


Fig 2









J. Ford Sculp.